

In the claims:

Please cancel claims 4 and 16-20.

5 Please amend claims 1, 5, 9-11 and 13 as follows:

1. (currently amended) A virtual Network Attached Storage (NAS) translator comprising:

10 a network interface that receives requests from clients, and receives server-data from a plurality of NAS appliance servers, each of the plurality of NAS appliance servers storing files and having a file system and a network connection;

wherein the server-data from the plurality of NAS appliance servers is carried over a network in network packets;

wherein the requests from clients are carried over the network in network packets;

15 wherein the requests from clients are messages using a networked-file-protocol, the requests including initial requests that contain a file name and a directory-path locator;

a hash engine, receiving the file name and a directory-path locator from the network interface, the hash engine generating a hashed-name key having a fixed-length;

20 a translation table with a plurality of entries that each contain a storage key, file meta-data, and a unique identifier, the entries not storing the file name;

wherein the meta-data includes a server identifier that indicates a server storing the file in the plurality of NAS appliance servers;

a comparator, receiving the hashed-name key and the storage key, for selecting a

25 matching entry in the translation table, the matching entry having a storage key that matches the hashed-name key; and

a reply generator, receiving the unique identifier for the matching entry from the translation table, for generating a reply to the client that is sent through the network interface to the client, the reply containing a virtual file handle using the unique identifier;

30 wherein the requests from clients also include secondary requests that contain the virtual file handle received by the client from the replay generator;

a secondary translator, receiving the virtual file handle from the client, the secondary translator extracting a client unique identifier from the virtual file handle and searching the translation table for a matching entry that has the unique identifier matching the client unique identifier; and
5 a request forwarder, coupled to the network interface, for substituting a native file handle for the matching entry for the virtual file handle to generate a request to a NAS appliance server in the plurality of NAS appliance servers,
whereby virtual file handles from clients are replaced with native file handles by the virtual NAS translator before being forwarded to the plurality of NAS appliance servers.

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2. (original) The virtual NAS translator of claim 1 wherein the file name has a variable length and the hashed-name key and the storage key are each fixed-length values having a same fixed length.

15 3. (original) The virtual NAS translator of claim 2 wherein the same fixed length is 6 bytes and the variable length is from 1 to 256 bytes.

4. (canceled)

20 5. (currently amended) The virtual NAS translator of ~~claim 4~~ claim 1 wherein the translation table comprises:
a hashed-key translation table with entries selectable by matching the hashed-name key to the storage key in the matching entry;
wherein entries in the hashed-key translation table are also selectable by matching an
25 input unique identifier to the unique identifier stored in the matching entry;
an open-file translation table having entries that store a unique identifier, meta-data, and a native file handle;
wherein the secondary translator finds a matching entry in the open-file translation table and outputs the native file handle from the matching entry.

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6. (original) The virtual NAS translator of claim 5 wherein the meta-data for a selected entry in the hashed-key translation table further comprises:

server-handle pairs that comprise:

a network address of a selected NAS appliance server that stores a selected file

5 referenced by the selected entry; and

a native file handle that a file system on the selected NAS appliance server uses to locate the selected file on the selected NAS appliance server;

wherein when the selected file is stored on a first server and a second server in the

plurality of NAS appliance servers, the server-handle pairs include a first server-

10 handle pair for a first copy of the selected file on the first server, and a second

server-handle pair for a second copy of the selected file on the second server,

wherein server-handle pairs stored in the selected entry can locate redundant copies of files on different NAS appliance servers.

15 7. (original) The virtual NAS translator of claim 5 further comprising:

a collision-resolution block storing colliding entries for a first file and a second file that

have a same storage key but have different file names or directory-path locators;

wherein colliding entries comprise the same storage key, a first file name of the first file,

a first unique identifier for the first file, a second file name of the second file, and

20 a second unique identifier for the second file,

wherein when the hash engine generates a hashed-name key that matches the same

storage key, the collision-resolution block is accessed.

8. (original) The virtual NAS translator of claim 5 wherein the hash engine executes a

25 cryptographic hash function or a pseudo-cryptographic hash function.

9. (currently amended) A virtual Network Attached Storage (NAS) translator comprising:

a network interface that receives requests from clients, and receives server-data from a

30 plurality of NAS appliance servers, each of the plurality of NAS appliance servers storing files and having a file system and a network connection;

wherein the server-data from the plurality of NAS appliance servers is carried over a network in network packets;

wherein the requests from clients are carried over the network in network packets;

wherein the requests from clients are messages using a networked-file-protocol, the

5 requests including initial requests that contain a file name and a directory-path locator;

a hash engine, receiving the file name and a directory-path locator from the network interface, the hash engine generating a hashed-name key having a fixed-length;

10 a translation table with a plurality of entries that each contain a storage key, file meta-data, and a unique identifier, the entries not storing the file name;

wherein the meta-data includes a server identifier that indicates a server storing the file in the plurality of NAS appliance servers;

a comparator, receiving the hashed-name key and the storage key, for selecting a matching entry in the translation table, the matching entry having a storage key that matches the hashed-name key; and

15 a reply generator, receiving the unique identifier for the matching entry from the translation table, for generating a reply to the client that is sent through the network interface to the client, the reply containing a virtual file handle using the unique identifier;

20 ~~The virtual NAS translator of claim 1 further comprising:~~

a secondary hash engine, receiving the hashed-name key from the hash engine, for generating a locator key;

wherein the locator key selects a bucket of entries from the translation table;

wherein the comparator compares the hashed-name key to storage keys from the bucket

25 of entries but does not compare to storage keys from un-selected buckets of entries,

whereby buckets of entries are selected by the locator key.

30 10. (currently amended) The virtual NAS translator of ~~claim 1~~ of claim 9 further comprising:

a counter that generates the unique identifier when a new entry is loaded into the translation table,
wherein the virtual file handles are generated from the counter and not from the native file handles.

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11. (currently amended) The virtual NAS translator of claim 9 ~~of claim 1~~ wherein each NAS appliance server comprises:

a server network connection;

a network-file layer that processes messages using the networked-file-protocol;

10 a file system having a native translation table that receives native file handles and generates physical file addresses;

a disk that stores files that are accessible by the physical file addresses.

12. (original) The virtual NAS translator of claim 11 wherein each NAS appliance
15 server further comprises:

a Transport-Control-Protocol/Internet Protocol (TCP/IP) layer, coupled to the network connection and to the network-file layer, for extracting and encapsulating messages sent over the server network connection as network packets.

20 13. (currently amended) The virtual NAS translator of claim 9 ~~of claim 1~~ wherein the network connection further comprises a Transport-Control-Protocol/Internet Protocol (TCP/IP) layer;
wherein the network packets are TCP/IP packets.

25 14. (original) The virtual NAS translator of claim 13 wherein the directory-path locator is a parent virtual file handle or a path name of a parent directory.

15. (original) The virtual NAS translator of claim 14 wherein the networked-file-protocol is a Network-File-System (NFS) or a Common-Internet-File-System (CIFS).

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16-20. (canceled)

